

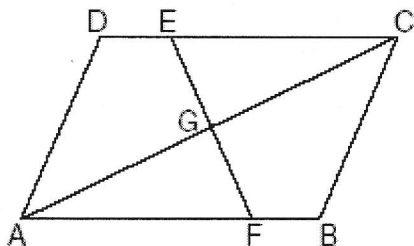
Geometry Review Booklet

Instructions to students and parents: This booklet is intended to help you practice for the *Geometry* Regents exam. It contains 40 geometry questions from previous years' Regents exams, which reflect work that you have done throughout this year. There are two types of questions. Multiple-choice are questions which you must answer by choosing the correct one among four possible answers, labeled A, B, C, and D. Multiple-choice questions on the exam are worth two points each, with no partial credit given. The second type is called constructed-response, in which you must come up with the answer yourself. Constructed-response questions on the exam can be worth two, four or six points, depending on how much work is involved in solving them. They are scored by your teachers using a **rubric**, which describes how many points a particular answer is worth. It is very important that you show **all** your work, since this type of question can earn you partial credit. The answer key which accompanies this booklet provides rubrics for all of the constructed-response questions in the booklet, so you can see what a rubric looks like and how it can be used to award points.

The best way to practice for the Regents exam would be to work on eight problems in this booklet per day. The questions are taken from a website www.jmap.org where many more practice problems are available. We have attached a formula and reference sheet at the back of this booklet, just like the one you will be provided with during the actual *Geometry* Regents exam. Good luck with your practice and on the exam!

1. 080310b, P.I. G.G.28

In the accompanying diagram of parallelogram $ABCD$, $\overline{DE} \cong \overline{BF}$.



Triangle EGC can be proved congruent to triangle FGA by

- [A] $SSA \cong SSA$ [B] $HL \cong HL$
 [C] $AAS \cong AAS$ [D] $AAA \cong AAA$

2. fall0806ge, P.I. G.G.9

Line k is drawn so that it is perpendicular to two distinct planes, P and R . What must be true about planes P and R ?

- [A] Planes P and R are parallel.
 [B] Planes P and R are skew.
 [C] Planes P and R are perpendicular.
 [D] Plane P intersects plane R but is not perpendicular to plane R .

3. 010030a, P.I. G.G.12

The volume of a rectangular pool is 1,080 cubic meters. Its length, width, and depth are in the ratio 10:4:1. Find the number of meters in each of the three dimensions of the pool.

4. 010221a, P.I. G.G.25

Seth is thinking of a number between 20 and 30. The number is prime and not more than 2 away from a perfect square. What is the number?

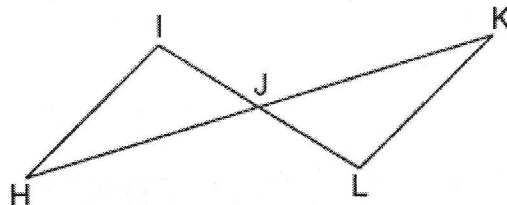
5. 089920a, P.I. G.G.31

What is the perimeter of an equilateral triangle whose height is $2\sqrt{3}$?

- [A] $6\sqrt{3}$ [B] $12\sqrt{3}$ [C] 12 [D] 6

6. 060420b, P.I. G.G.28

In the accompanying diagram, \overline{HK} bisects \overline{IL} and $\angle H \cong \angle K$.



What is the most direct method of proof that could be used to prove $\triangle HIJ \cong \triangle KIJ$?

- [A] $AAS \cong AAS$ [B] $ASA \cong ASA$
 [C] $SAS \cong SAS$ [D] $HL \cong HL$

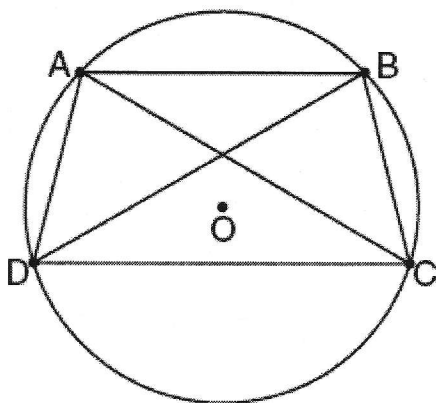
7. 060008a, P.I. G.G.71

Which equation represents a circle whose center is $(3, -2)$?

- [A] $(x - 3)^2 + (y + 2)^2 = 4$
 [B] $(x + 3)^2 + (y - 2)^2 = 4$
 [C] $(x - 2)^2 + (y + 3)^2 = 4$
 [D] $(x + 2)^2 + (y - 3)^2 = 4$

8. fall0838ge, P.I. G.G.28

In the diagram below, quadrilateral $ABCD$ is inscribed in circle O , $\overline{AB} \parallel \overline{DC}$, and diagonals \overline{AC} and \overline{BD} are drawn. Prove that $\triangle ACD \cong \triangle BDC$.



9. 010514b, P.I. G.G.71

What is the equation of a circle with center $(-3, 1)$ and radius 7?

[A] $(x + 3)^2 + (y - 1)^2 = 49$

[B] $(x + 3)^2 + (y - 1)^2 = 7$

[C] $(x - 3)^2 + (y + 1)^2 = 49$

[D] $(x - 3)^2 + (y + 1)^2 = 7$

10. 010719b, P.I. G.G.61

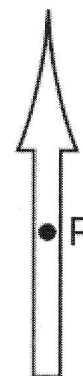
Which transformation represents a dilation?

[A] $(8, 4) \rightarrow (-4, -8)$ [B] $(8, 4) \rightarrow (-8, 4)$

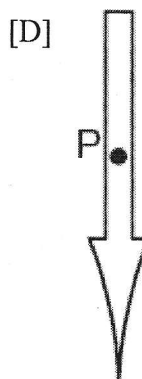
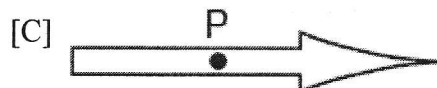
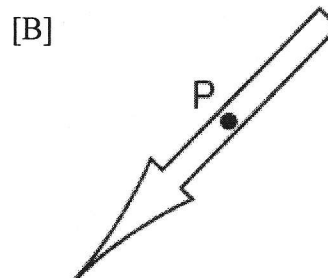
[C] $(8, 4) \rightarrow (11, 7)$ [D] $(8, 4) \rightarrow (4, 2)$

11. 080721a, P.I. G.G.54

The accompanying diagram shows the starting position of the spinner on a board game.



How does this spinner appear after a 270° counterclockwise rotation about point P ?



12. 010538a, P.I. G.G.30

In $\triangle ABC$, the measure of $\angle B$ is 21 less than four times the measure of $\angle A$, and the measure of $\angle C$ is 1 more than five times the measure of $\angle A$. Find the measure, in degrees, of *each* angle of $\triangle ABC$.

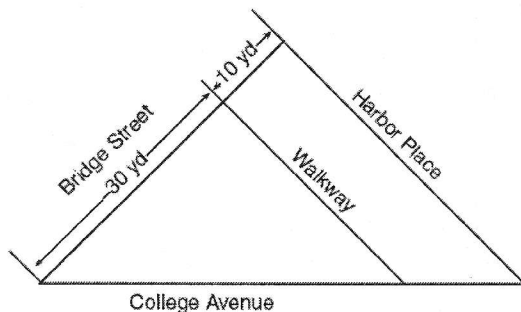
13. 010102a, P.I. G.G.30

In right triangle ABC , $m\angle C = 3y - 10$, $m\angle B = y + 40$, and $m\angle A = 90$. What type of right triangle is triangle ABC ?

- [A] obtuse [B] isosceles
[C] equilateral [D] scalene

14. 060332a, P.I. G.G.22

A triangular park is formed by the intersection of three streets, Bridge Street, Harbor Place, and College Avenue, as shown in the accompanying diagram. A walkway parallel to Harbor Place goes through the park. A time capsule has been buried in the park in a location that is equidistant from Bridge Street and College Avenue and 5 yards from the walkway. Indicate on the diagram with an **X** *each* possible location where the time capsule could be buried.



15. 010810a, P.I. G.G.30

If the measures, in degrees, of the three angles of a triangle are x , $x + 10$, and $2x - 6$, the triangle must be

- [A] right [B] equilateral
[C] scalene [D] isosceles

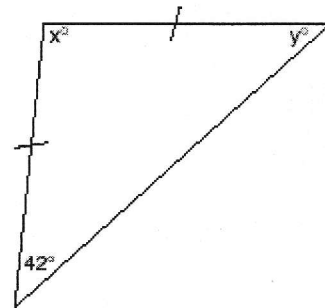
16. 080613b, P.I. G.G.31

If the perimeter of an equilateral triangle is 18, the length of the altitude of this triangle is

- [A] $6\sqrt{3}$ [B] 6 [C] 3 [D] $3\sqrt{3}$

17. 060510a, P.I. G.G.31

Tina wants to sew a piece of fabric into a scarf in the shape of an isosceles triangle, as shown in the accompanying diagram.

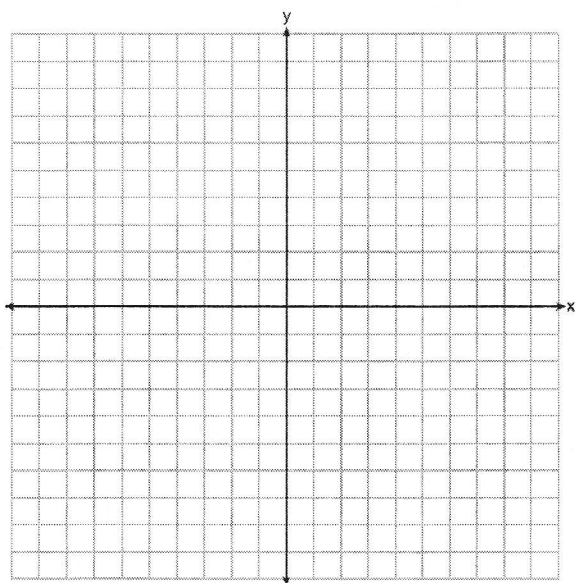


What are the values of x and y ?

- [A] $x = 96$ and $y = 42$
[B] $x = 42$ and $y = 96$
[C] $x = 69$ and $y = 69$
[D] $x = 90$ and $y = 48$

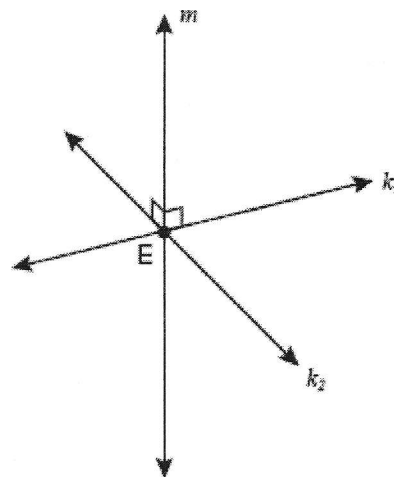
18. fall0837ge, P.I. G.G.23

A city is planning to build a new park. The park must be equidistant from school A at $(3,3)$ and school B at $(3,-5)$. The park also must be exactly 5 miles from the center of town, which is located at the origin on the coordinate graph. Each unit on the graph represents 1 mile. On the set of axes below, sketch the compound loci and label with an **X** all possible locations for the new park.



19. fall0816ge, P.I. G.G.1

Lines k_1 and k_2 intersect at point E . Line m is perpendicular to lines k_1 and k_2 at point E .



Which statement is always true?

- [A] Line m is perpendicular to the plane determined by lines k_1 and k_2 .
- [B] Lines k_1 and k_2 are perpendicular.
- [C] Line m is parallel to the plane determined by lines k_1 and k_2 .
- [D] Line m is coplanar with lines k_1 and k_2 .

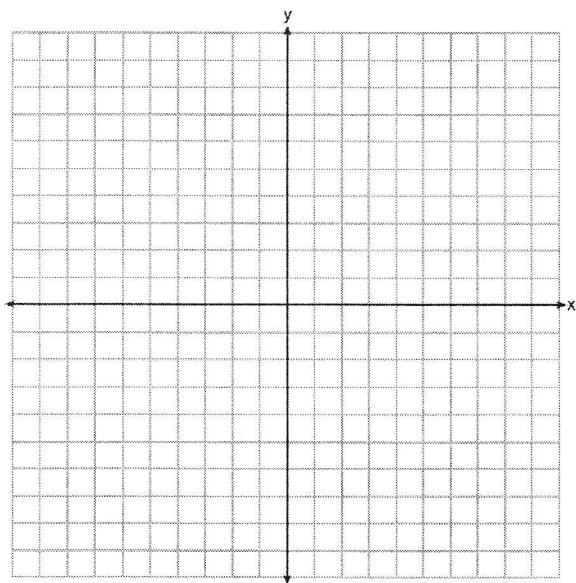
20. 060809b, P.I. G.G.54

If point $(5, 2)$ is rotated counterclockwise 90° about the origin, its image will be point

- | | |
|----------------|---------------|
| [A] $(2, 5)$ | [B] $(-2, 5)$ |
| [C] $(-5, -2)$ | [D] $(2, -5)$ |

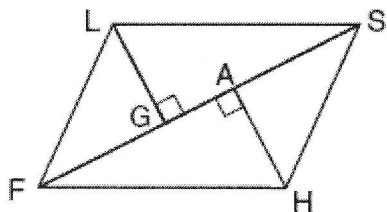
21. 080838a, P.I. G.G.61

On the accompanying set of axes, draw $\triangle ABC$, whose coordinates are $A(-7,9)$, $B(-2,8)$, and $C(-3,4)$. Then draw, label, and state the coordinates of $\triangle A'B'C'$, the image of $\triangle ABC$ after the transformation that maps (x,y) to $(-x,-y)$. Based on your diagram, identify the type of transformation that was performed.



22. 010634b, P.I. G.G.28

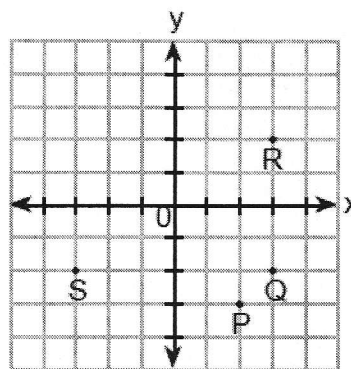
Given: parallelogram $FLSH$, diagonal \overline{FGAS} , $\overline{LG} \perp \overline{FS}$, $\overline{HA} \perp \overline{FS}$



Prove: $\triangle LGS \cong \triangle HAF$

23. 069908a, P.I. G.G.61

If $x = -3$ and $y = 2$, which point on the accompanying graph represents $(-x, -y)$?



[A] P [B] Q [C] R [D] S

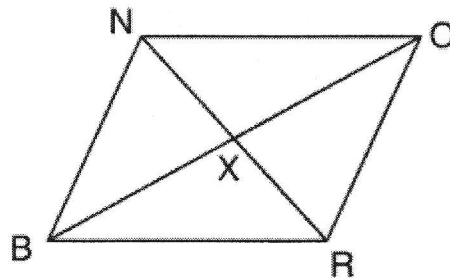
24. fall0828ge, P.I. G.G.62

What is the slope of a line perpendicular to the line whose equation is $5x + 3y = 8$?

[A] $-\frac{3}{5}$ [B] $\frac{5}{3}$ [C] $\frac{3}{5}$ [D] $-\frac{5}{3}$

25. 080731b, P.I. G.G.28

The accompanying diagram shows quadrilateral $BRON$, with diagonals \overline{NR} and \overline{BO} , which bisect each other at X .



Prove: $\triangle BNX \cong \triangle ORX$

26. 010834a, P.I. G.G.64

Write an equation of a line that is perpendicular to the line $y = \frac{2}{3}x + 5$ and that passes through the point (0,4).

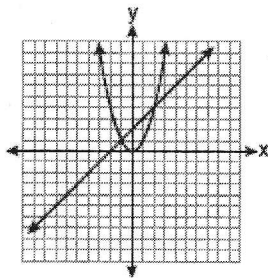
27. fall0805ge, P.I. G.G.70

Which graph could be used to find the solution to the following system of equations?

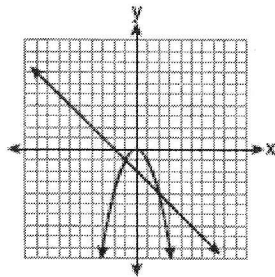
$$y = -x + 2$$

$$y = x^2$$

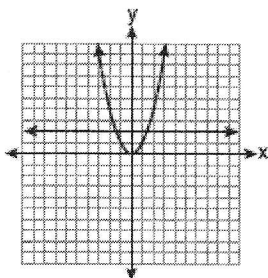
[A]



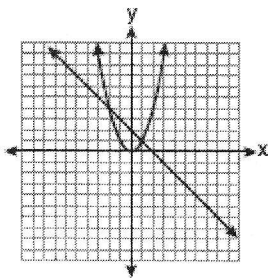
[B]



[C]

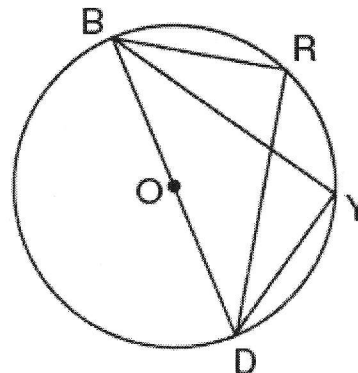


[D]



28. 010732b, P.I. G.G.28

In the accompanying diagram, $m\widehat{BR} = 70$, $m\widehat{YD} = 70$, and \overline{BOD} is the diameter of circle O . Write an explanation or a proof that shows $\triangle RBD$ and $\triangle YDB$ are congruent.



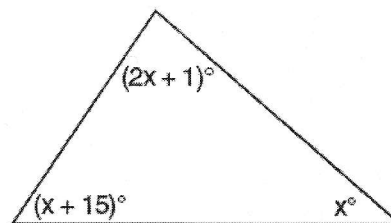
29. fall0809ge, P.I. G.G.31

The vertices of $\triangle ABC$ are $A(-1,-2)$, $B(-1,2)$ and $C(6,0)$. Which conclusion can be made about the angles of $\triangle ABC$?

- [A] $m\angle A = m\angle B$ [B] $m\angle ABC = 60$
 [C] $m\angle A = m\angle C$ [D] $m\angle ACB = 90$

30. 080216a, P.I. G.G.30

What is the measure of the largest angle in the accompanying triangle?



- [A] 83 [B] 46.5 [C] 41 [D] 56

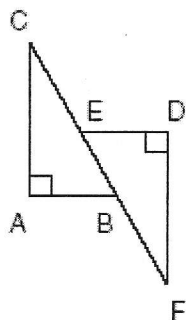
31. 060107a, P.I. G.G.31

In isosceles triangle DOG , the measure of the vertex angle is three times the measure of one of the base angles. Which statement about $\triangle DOG$ is true?

- [A] $\triangle DOG$ is an acute triangle.
- [B] $\triangle DOG$ is an obtuse triangle.
- [C] $\triangle DOG$ is a scalene triangle.
- [D] $\triangle DOG$ is a right triangle.

32. 060320b, P.I. G.G.28

In the accompanying diagram, $\overline{CA} \perp \overline{AB}$, $\overline{ED} \perp \overline{DF}$, $\overline{ED} \parallel \overline{AB}$, $\overline{CE} \cong \overline{BF}$, $\overline{AB} \cong \overline{ED}$ and $m\angle CAB = m\angle FDE = 90$.

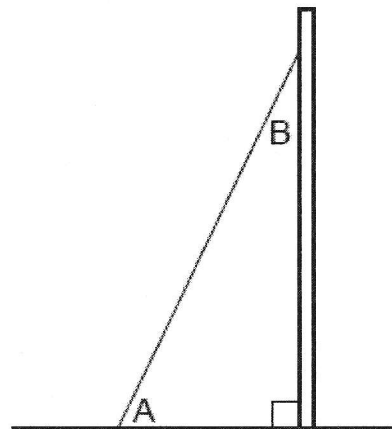


Which statement would *not* be used to prove $\triangle ABC \cong \triangle DEF$?

- [A] $SSS \cong SSS$
- [B] $SAS \cong SAS$
- [C] $HL \cong HL$
- [D] $AAS \cong AAS$

33. 080837a, P.I. G.G.30

A billboard on level ground is supported by a brace, as shown in the accompanying diagram. The measure of angle A is 15° greater than twice the measure of angle B . Determine the measure of angle A and the measure of angle B .



34. 080003a, P.I. G.G.22

In the coordinate plane, what is the total number of points 5 units from the origin and equidistant from both the x - and y -axes?

- [A] 1
- [B] 2
- [C] 0
- [D] 4

35. 010722a, P.I. G.G.30

If the measures of the angles of a triangle are represented by $2x$, $3x - 15$, and $7x + 15$, the triangle is

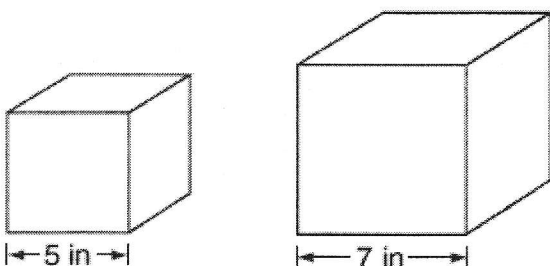
- [A] a right triangle
- [B] an isosceles triangle
- [C] an acute triangle
- [D] an equiangular triangle

36. fall0833ge, P.I. G.G.14

The volume of a cylinder is $12,566.4 \text{ cm}^3$.
The height of the cylinder is 8 cm. Find the radius of the cylinder to the *nearest tenth of a centimeter*.

37. 060737a, P.I. G.G.12

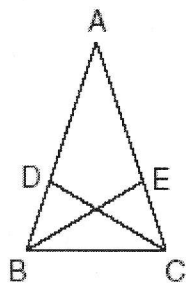
Tracey has two empty cube-shaped containers with sides of 5 inches and 7 inches, as shown in the accompanying diagram. She fills the smaller container completely with water and then pours all the water from the smaller container into the larger container. How deep, to the *nearest tenth of an inch*, will the water be in the larger container?



38. 060204b, P.I. G.G.28

In the accompanying diagram of $\triangle ABC$,

$$\overline{AB} \cong \overline{AC}, \overline{BD} = \frac{1}{3} \overline{BA}, \text{ and } \overline{CE} = \frac{1}{3} \overline{CA}.$$

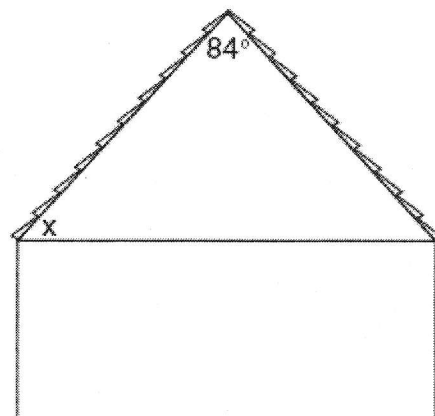


Triangle EBC can be proved congruent to triangle DCB by

- [A] $SSS \cong SSS$ [B] $ASA \cong ASA$
[C] $HL \cong HL$ [D] $SAS \cong SAS$

39. 060615a, P.I. G.G.31

The accompanying diagram shows the roof of a house that is in the shape of an isosceles triangle. The vertex angle formed at the peak of the roof is 84° .

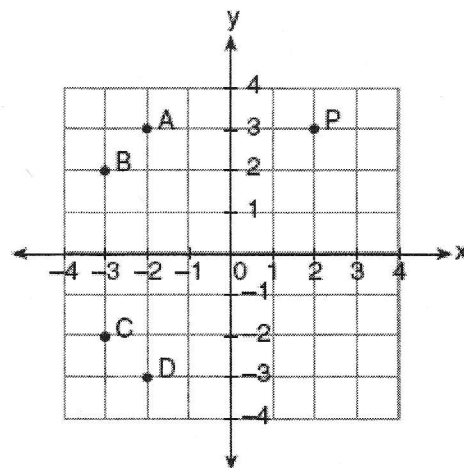


What is the measure of x ?

- [A] 138° [B] 48° [C] 84° [D] 96°

40. 010418a, P.I. G.G.61

In the accompanying graph, if point P has coordinates (a,b) , which point has coordinates $(-b,a)$?



- [A] B [B] D [C] A [D] C

Geometry Reference Sheet

The Regents Examination in Geometry will include a reference sheet containing the formulas specified below.

Volume	Cylinder	$V = Bh$ where B is the area of the base
	Pyramid	$V = \frac{1}{3}Bh$ where B is the area of the base
	Right Circular Cone	$V = \frac{1}{3}Bh$ where B is the area of the base
	Sphere	$V = \frac{4}{3}\pi r^3$

Lateral Area (L)	Right Circular Cylinder	$L = 2\pi rh$
	Right Circular Cone	$L = \pi rl$ where l is the slant height

Surface Area	Sphere	$SA = 4\pi r^2$
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Answer Key for the Geometry Review Booklet

Spring 2009

Instructions to students: After you have worked on the Geometry Review problems, check your answers in this booklet. The constructed-response questions are scored with a rubric, so you can judge how many points your response would earn.

[1] C _____

[2] A _____

[3] 3, 12, and 30 and an appropriate arithmetic method or equation is shown, such as $40x^3 = 1080$.

[2] An appropriate equation or method is shown, but not all three dimensions are found.
or [2] An appropriate method is shown, and although one computational mistake is made, the student does find three dimensions based on this mistake, such as dividing 1080 by 40 incorrectly.

[1] The student shows that multiplication is required to find volume but sets up an incorrect method and does not find three dimensions.

or [1] 3, 12, and 30 and no work is shown.

[0] The sum is used instead of the product,

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[3] incorrect procedure.

[2] 23, and appropriate work is shown.

[1] Appropriate work is shown, but no answer or an incorrect answer is found.

or [1] 23, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[4] incorrect procedure.

[5] C _____

[6] A _____

[7] A _____

[6] A complete and correct proof that includes a concluding statement is written.

[5] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or incorrect.

[4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements or reasons are missing or incorrect.

[3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[2] A proof is written that demonstrates an understanding of the method of proof, but one conceptual error is made and one statement or reason is missing or incorrect.

or [2] Some correct relevant statements about the proof are made, but three or four statements or reasons are missing or incorrect.

[1] Only one correct relevant statement and reason are written.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[9] A _____

[10] D _____

[11] C _____

[4] $m\angle A = 20$, $m\angle B = 59$, and $m\angle C = 101$, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made.

or [3] A correct equation is written and solved, and the correct measures for the angles are found, but they are not labeled or are labeled incorrectly.

[2] Appropriate work is shown, but two or more computational errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] A correct equation is written and solved for x , but the measures of the angles are not found.

or [2] An incorrect equation of equal difficulty is solved appropriately, and the three angles are found.

[1] Appropriate work is shown, but one conceptual error and one computational error are made.

or [1] A correct equation is written, but no further correct work is shown.

or [1] $m\angle A = 20$, $m\angle B = 59$, and $m\angle C = 101$, but no work is shown.

[0] $m\angle A = 20$, or $m\angle B = 59$, or $m\angle C = 101$, but no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[12] incorrect procedure.

[13] D _____

[4] Two **X**s are indicated at the intersections of the angle bisector and the parallel lines in the correct sketch of the loci.

[3] All loci are drawn correctly, but no **X**s are drawn to indicate the locations, or only one **X** is drawn.

or [3] The angle bisector is drawn correctly, but only one line is drawn parallel to the walkway, but an **X** is indicated appropriately.

[2] Only one correct locus is drawn, but **X**s indicate the two appropriate locations of the intersection of the loci.

[1] **X**s are drawn in the correct locations, but no loci are shown.

or [1] Only one correct locus is drawn, and no **X**s are indicated.

or [1] Both loci are drawn incorrectly, but **X**s are drawn on the appropriate points of intersection.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[14] incorrect procedure.

[15] C _____

[16] D _____

[17] A _____

[4] Both loci are drawn correctly and the two points of intersection are labeled with an **X**.

[3] Both loci are drawn correctly, but only one correct point of intersection is labeled.

or [3] Both loci are drawn, but one graphing error is made, but appropriate points of intersection are labeled.

[2] Both loci are drawn correctly, but the points of intersection are not labeled or are labeled incorrectly.

or [2] Both loci are drawn, but two or more graphing errors are made, but appropriate points of intersection are labeled.

or [2] One conceptual error is made, such as drawing two parallel lines instead of a circle, but appropriate points of intersection are labeled.

[1] One locus is drawn correctly, but no further correct work is shown.

or [1] **Xs** are placed appropriately, but no loci are drawn.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[18] incorrect procedure.

[19] A

[20] B

[4] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, and the coordinates of $\triangle A'B'C'$ are stated as $A'(7,-9)$, $B'(2,-8)$, and $C'(3,-4)$, and point reflection or dilation with a factor of -1 . (Note: rotation or rotation of 180° is an acceptable answer.)

[3] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, but the coordinates of $\triangle A'B'C'$ are not stated or are stated incorrectly but a correct transformation is stated.

or [3] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, and the coordinates of $\triangle A'B'C'$ are stated correctly, but the type of transformation is not stated or is stated incorrectly.

or [3] $\triangle ABC$ is not graphed, but $\triangle A'B'C'$ is graphed and labeled correctly, and its coordinates are stated correctly, and a correct transformation is stated.

or [3] $\triangle ABC$ is graphed incorrectly, but $\triangle A'B'C'$ is graphed and labeled appropriately, its coordinates are stated appropriately, and an appropriate type of transformation is stated.

[2] $\triangle ABC$ is graphed correctly, but one conceptual error is made, such as graphing an incorrect transformation, but the points are labeled appropriately, its coordinates are stated appropriately, and an appropriate type of transformation is stated.

or [2] $\triangle ABC$ is not graphed, but $\triangle A'B'C'$ is graphed and labeled correctly, and its coordinates are stated correctly, but the type of transformation is not stated or is stated incorrectly.

or [2] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, but the coordinates of and the type of transformation are not stated or are stated incorrectly

or [2] $\triangle ABC$ and $\triangle A'B'C'$ are not graphed, but the correct coordinates of $\triangle A'B'C'$ and a correct transformation are stated.

[1] Either $\triangle ABC$ or $\triangle A'B'C'$ is graphed correctly, but the coordinates of $\triangle A'B'C'$ and the type of transformation are not stated or are stated incorrectly.

or [1] $A'(7,-9)$, $B'(2,-8)$, and $C'(3,-4)$, but no further correct work is shown.

[21] or [1] A correct transformation is stated, but

no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[6] A complete and correct proof is written.

[5] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or is incorrect, or the concluding statement is missing.

[4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements or reasons are missing or are incorrect.

[3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[2] Some correct relevant statements about the proof are made, but three or four statements or reasons are missing or are incorrect.

[1] Only one correct statement and reason are written.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[22] incorrect procedure.

[23] B _____

[24] C _____

[4] A complete and correct proof that includes a concluding statement is written.

[3] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or is incorrect or the concluding statement is missing.

[2] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[1] Some correct relevant statements about the proof are made, but two or three statements and/or reasons are missing or are incorrect.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[25] incorrect procedure.

[2] A correct equation is written, such as

$$y = -\frac{3}{2}x + 4 \text{ or } (y - 4) = -\frac{3}{2}(x - 0).$$

[1] An appropriate equation is written, but one computational error is made or one incorrect substitution is made.

[1] An appropriate equation is written, but one conceptual error is made, such as writing an equation for a parallel line going through (0,4) or for a perpendicular line that does not go through (0,4).

or [1] The slope is identified correctly as $-\frac{3}{2}$

or the y-intercept as 4, but no equation or an incorrect equation is written.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[26] incorrect procedure.

[27] D _____

[4] Appropriate work is shown to explain why or prove the triangles are congruent.

[3] An explanation is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one reason is missing or is incorrect.

[2] An explanation is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[1] Some correct relevant statements about the method of proof are made, but two or three statements or reasons are missing or are incorrect.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[28] incorrect procedure.

[29] A

[30] A

[31] B

[32] A

[3] $m\angle A = 65$ and $m\angle B = 25$, and appropriate work is shown.

[2] Appropriate work is shown, but one computational error is made.

or [2] Appropriate work is shown to find 65 and 25, but the angles are not labeled or are labeled incorrectly.

or [2] An incorrect expression is written for angle A , but an appropriate equation is solved, and appropriate measures of angle A and angle B are found.

or [2] Appropriate work is shown to find $x = 25$, but no further correct work is shown.

[1] Appropriate work is shown, but two or more computational errors are made.

or [1] Appropriate work is shown, but one conceptual error is made, such as solving the equation $3x + 15 = 180$ for both the measures of angle A and angle B .

or [1] A correct equation is written, but no further correct work is shown.

or [1] $m\angle A = 65$ and $m\angle B = 25$, but no work is shown.

[0] $m\angle A = 65$ or $m\angle B = 25$, but no work is shown.

or [0] 65 and 25, but no work is shown, and the angles are not labeled or are labeled incorrectly.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[33] incorrect procedure.

[34] D

[35] B

[2] 22.4, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] 22.4, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[36] incorrect procedure.

[3] 2.6, and appropriate work is shown, such as $(5 \bullet 5 \bullet 5) = (7 \bullet 7)h$.

[2] Appropriate work is shown, but one computational or rounding error is made.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or [1] Appropriate work is shown, but one conceptual error is made, such as using an incorrect formula.

or [1] The volume of both of the cubes is found correctly, but no further correct work is shown.

or [1] 2.6, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[37] incorrect procedure.

[38] D

[39] B

[40] A

Answer Key for the Geometry Review Booklet

Spring 2009

Instructions to students: After you have worked on the Geometry Review problems, check your answers in this booklet. The constructed-response questions are scored with a rubric, so you can judge how many points your response would earn.

[1] C _____

[2] A _____

[3] 3, 12, and 30 and an appropriate arithmetic method or equation is shown, such as $40x^3 = 1080$.

[2] An appropriate equation or method is shown, but not all three dimensions are found.
or [2] An appropriate method is shown, and although one computational mistake is made, the student does find three dimensions based on this mistake, such as dividing 1080 by 40 incorrectly.

[1] The student shows that multiplication is required to find volume but sets up an incorrect method and does not find three dimensions.

or [1] 3, 12, and 30 and no work is shown.

[0] The sum is used instead of the product,
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[3] incorrect procedure.

[2] 23, and appropriate work is shown.

[1] Appropriate work is shown, but no answer or an incorrect answer is found.

or [1] 23, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[4] incorrect procedure.

[5] C _____

[6] A _____

[7] A _____

[6] A complete and correct proof that includes a concluding statement is written.

[5] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or incorrect.

[4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements or reasons are missing or incorrect.

[3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[2] A proof is written that demonstrates an understanding of the method of proof, but one conceptual error is made and one statement or reason is missing or incorrect.

or [2] Some correct relevant statements about the proof are made, but three or four statements or reasons are missing or incorrect.

[1] Only one correct relevant statement and reason are written.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[9] A _____

[10] D _____

[11] C _____

[4] $m\angle A = 20$, $m\angle B = 59$, and $m\angle C = 101$, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made.

or [3] A correct equation is written and solved, and the correct measures for the angles are found, but they are not labeled or are labeled incorrectly.

[2] Appropriate work is shown, but two or more computational errors are made.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] A correct equation is written and solved for x , but the measures of the angles are not found.

or [2] An incorrect equation of equal difficulty is solved appropriately, and the three angles are found.

[1] Appropriate work is shown, but one conceptual error and one computational error are made.

or [1] A correct equation is written, but no further correct work is shown.

or [1] $m\angle A = 20$, $m\angle B = 59$, and $m\angle C = 101$, but no work is shown.

[0] $m\angle A = 20$, or $m\angle B = 59$, or $m\angle C = 101$, but no work is shown.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[12] incorrect procedure.

[13] D _____

[4] Two **X**s are indicated at the intersections of the angle bisector and the parallel lines in the correct sketch of the loci.

[3] All loci are drawn correctly, but no **X**s are drawn to indicate the locations, or only one **X** is drawn.

or [3] The angle bisector is drawn correctly, but only one line is drawn parallel to the walkway, but an **X** is indicated appropriately.

[2] Only one correct locus is drawn, but **X**s indicate the two appropriate locations of the intersection of the loci.

[1] **X**s are drawn in the correct locations, but no loci are shown.

or [1] Only one correct locus is drawn, and no **X**s are indicated.

or [1] Both loci are drawn incorrectly, but **X**s are drawn on the appropriate points of intersection.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[14] incorrect procedure.

[15] C _____

[16] D _____

[17] A _____

[4] Both loci are drawn correctly and the two points of intersection are labeled with an **X**.

[3] Both loci are drawn correctly, but only one correct point of intersection is labeled.

or [3] Both loci are drawn, but one graphing error is made, but appropriate points of intersection are labeled.

[2] Both loci are drawn correctly, but the points of intersection are not labeled or are labeled incorrectly.

or [2] Both loci are drawn, but two or more graphing errors are made, but appropriate points of intersection are labeled.

or [2] One conceptual error is made, such as drawing two parallel lines instead of a circle, but appropriate points of intersection are labeled.

[1] One locus is drawn correctly, but no further correct work is shown.

or [1] **X**s are placed appropriately, but no loci are drawn.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[18] incorrect procedure.

[19] A

[20] B

[4] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, and the coordinates of $\triangle A'B'C'$ are stated as $A'(7,-9)$, $B'(2,-8)$, and $C'(3,-4)$, and point reflection or dilation with a factor of -1 . (Note: rotation or rotation of 180° is an acceptable answer.)

[3] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, but the coordinates of $\triangle A'B'C'$ are not stated or are stated incorrectly but a correct transformation is stated.

or [3] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, and the coordinates of $\triangle A'B'C'$ are stated correctly, but the type of transformation is not stated or is stated incorrectly.

or [3] $\triangle ABC$ is not graphed, but $\triangle A'B'C'$ is graphed and labeled correctly, and its coordinates are stated correctly, and a correct transformation is stated.

or [3] $\triangle ABC$ is graphed incorrectly, but $\triangle A'B'C'$ is graphed and labeled appropriately, its coordinates are stated appropriately, and an appropriate type of transformation is stated.

[2] $\triangle ABC$ is graphed correctly, but one conceptual error is made, such as graphing an incorrect transformation, but the points are labeled appropriately, its coordinates are stated appropriately, and an appropriate type of transformation is stated.

or [2] $\triangle ABC$ is not graphed, but $\triangle A'B'C'$ is graphed and labeled correctly, and its coordinates are stated correctly, but the type of transformation is not stated or is stated incorrectly.

or [2] $\triangle ABC$ and $\triangle A'B'C'$ are graphed and labeled correctly, but the coordinates of and the type of transformation are not stated or are stated incorrectly

or [2] $\triangle ABC$ and $\triangle A'B'C'$ are not graphed, but the correct coordinates of $\triangle A'B'C'$ and a correct transformation are stated.

[1] Either $\triangle ABC$ or $\triangle A'B'C'$ is graphed correctly, but the coordinates of $\triangle A'B'C'$ and the type of transformation are not stated or are stated incorrectly.

or [1] $A'(7,-9)$, $B'(2,-8)$, and $C'(3,-4)$, but no further correct work is shown.

[21] or [1] A correct transformation is stated, but

no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

[6] A complete and correct proof is written.

[5] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or is incorrect, or the concluding statement is missing.

[4] A proof is written that demonstrates a good understanding of the method of proof and contains no conceptual errors, but two statements or reasons are missing or are incorrect.

[3] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[2] Some correct relevant statements about the proof are made, but three or four statements or reasons are missing or are incorrect.

[1] Only one correct statement and reason are written.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[22] incorrect procedure.

[23] B _____

[24] C _____

[4] A complete and correct proof that includes a concluding statement is written.

[3] A proof is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one statement or reason is missing or is incorrect or the concluding statement is missing.

[2] A proof is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[1] Some correct relevant statements about the proof are made, but two or three statements and/or reasons are missing or are incorrect.

[0] The "given" and/or the "prove" statements are rewritten in the style of a formal proof, but no further correct relevant statements are written.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[25] incorrect procedure.

[2] A correct equation is written, such as

$$y = -\frac{3}{2}x + 4 \text{ or } (y - 4) = -\frac{3}{2}(x - 0).$$

[1] An appropriate equation is written, but one computational error is made or one incorrect substitution is made.

[1] An appropriate equation is written, but one conceptual error is made, such as writing an equation for a parallel line going through (0,4) or for a perpendicular line that does not go through (0,4).

or [1] The slope is identified correctly as $-\frac{3}{2}$

or the y-intercept as 4, but no equation or an incorrect equation is written.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[26] incorrect procedure.

[27] D _____

[4] Appropriate work is shown to explain why or prove the triangles are congruent.

[3] An explanation is written that demonstrates a thorough understanding of the method of proof and contains no conceptual errors, but one reason is missing or is incorrect.

[2] An explanation is written that demonstrates a good understanding of the method of proof, but one conceptual error is made.

[1] Some correct relevant statements about the method of proof are made, but two or three statements or reasons are missing or are incorrect.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[28] incorrect procedure.

[29] A

[30] A

[31] B

[32] A

[3] $m\angle A = 65$ and $m\angle B = 25$, and appropriate work is shown.

[2] Appropriate work is shown, but one computational error is made.

or [2] Appropriate work is shown to find 65 and 25, but the angles are not labeled or are labeled incorrectly.

or [2] An incorrect expression is written for angle A , but an appropriate equation is solved, and appropriate measures of angle A and angle B are found.

or [2] Appropriate work is shown to find $x = 25$, but no further correct work is shown.

[1] Appropriate work is shown, but two or more computational errors are made.

or [1] Appropriate work is shown, but one conceptual error is made, such as solving the equation $3x + 15 = 180$ for both the measures of angle A and angle B .

or [1] A correct equation is written, but no further correct work is shown.

or [1] $m\angle A = 65$ and $m\angle B = 25$, but no work is shown.

[0] $m\angle A = 65$ or $m\angle B = 25$, but no work is shown.

or [0] 65 and 25, but no work is shown, and the angles are not labeled or are labeled incorrectly.

or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[33] incorrect procedure.

[34] D

[35] B

[2] 22.4, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] 22.4, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[36] incorrect procedure.

[3] 2.6, and appropriate work is shown, such as $(5 \bullet 5 \bullet 5) = (7 \bullet 7)h$.

[2] Appropriate work is shown, but one computational or rounding error is made.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or [1] Appropriate work is shown, but one conceptual error is made, such as using an incorrect formula.

or [1] The volume of both of the cubes is found correctly, but no further correct work is shown.

or [1] 2.6, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[37] incorrect procedure.

[38] D _____

[39] B _____

[40] A _____